MATERIAL SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

National Institute of Standards and Technology
Standard Reference Materials Program
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Gaithersburg, Maryland 20899-2320

RM Number: 8603
MSDS Number: 8603
RM Name: Lead Ore GBW 07236

Date of Issue: 30 September 2005

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Description: Reference Material (RM) 8603 is intended for use in geological and geochemical investigations. A unit of RM 8603 consists of approximately 100 g of ore pulverized to pass a 100 μm screen (–160 mesh).

Substance: **Lead Ore**

Other Designations: **Lead Ore** (chinese lead ore; chinese ore)

2. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Component: This product consists of the following major ore minerals and gangue minerals:

Component	CAS Number	EC Number (EINECS)
galena	1314-87-0	215-246-6
pyrite	1309-36-0	215-167-7
garnet	12178-41-5	Not assigned.
quartz	14808-60-7	238-878-4
diopside	14483-19-3	Not available.
sphalerite (ZnS)	1314-98-3	215-251-3

Component: This product consists of the following major gangue components and elements:

Component	CAS Number	EC Number (EINECS)	Nominal Concentration (% by mass)
calcium oxide (CaO)	1305-78-8	215-138-9	34.56
silicon dioxide (SiO_2)	7631-86-9	231-545-4	30.51
aluminum oxide (Al_2O_3)	1344-28-1	215-691-6	8.95
ferric oxide (Fe_2O_3)	1309-37-1	215-168-2	3.79
magnesium oxide (MgO)	1309-48-4	215-171-9	2.06
manganese oxide (MnO)	1344-43-0	215-695-8	1.53
iron (II) oxide (FeO)	1345-25-1	215-721-8	1.15
potassium oxide (K_2O)	12136-45-7	235-227-6	< 1.0
lead (Pb)	7439-92-1	231-100-4	< 0.7
sulfur (S)	7704-34-9	231-722-6	< 0.5
fluorine (F)	7782-41-4	231-954-8	< 0.5
titanium dioxide (TiO_2)	13463-67-7	236-675-5	< 0.5
phosphorus pentoxide (P_2O_5)	1314-56-3	215-236-1	< 0.1
sodium oxide (Na_2O)	1313-59-3	215-208-9	< 0.1
zinc (Zn)	7440-66-6	231-175-3	< 0.1
copper (Cu)	7440-50-8	231-159-6	< 0.05

NOTE: The total concentration of other elements in RM 8603 is less than 1 % of the composition of the mixture (Refer to Report of Investigation 8603) and is below the reportable limit required by OSHA according to 29 CFR 1910.1200 (g)(2)(i)(C)(1) for MSDS information of a health hazard.

EC Classification (assigned): T, N

EC Risk (R): 20, 22, 33, 49, 50, 53, 61, 62

EC Safety (S): 2, 24, 45, 46, 53

3. HAZARDS IDENTIFICATION

NFPA Ratings (Scale 0–4): Health = 2 Fire = 0 Reactivity = 0

Major Health Hazards: Cancer hazard (in humans). Birth defects.

Potential Health Effects

Inhalation: Acute exposure to lead ore dust may cause irritation of the respiratory tract and coughing. Lead compounds: Absorption of large amounts of lead may cause thirst, a burning sensation in the mouth and throat, and abdominal pain.

Skin Contact: Acute exposure to intact skin may cause irritation. Prolonged exposure may cause drying of the skin and dermatitis.

Eye Contact: Dust may cause irritation. Prolonged contact may cause conjunctivitis.

Ingestion: Lead compounds: Absorption of large amounts of lead from the intestinal tract may cause effects the same as acute inhalation. Calcium oxide may cause immediate burning pain to the esophagus and stomach and corrosion of the mucous membranes.

Listed as a Carcinogen/ Potential Carcinogen:	Yes	No	
	X		In the National Toxicology Program (NTP) Report on Carcinogens.
	X		In the International Agency for Research on Cancer (IARC) Monographs.
		X	By the Occupational Safety and Health Administration (OSHA).

4. FIRST AID MEASURES

Inhalation: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing by qualified personnel. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

Skin Contact: Wash skin with soap and water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention if necessary.

Eye Contact: Flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Get immediate medical attention.

Ingestion: If a large amount is swallowed, get immediate medical attention.

5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Lead ore is a negligible fire hazard.

Extinguishing Media: Use regular dry chemical, carbon dioxide, water, or regular foam.

Fire Fighting: Move container from fire area if possible without exposure to risk. Avoid inhalation of material or combustion by-products. Wear full protective clothing and NIOSH-approved self-contained breathing apparatus (SCBA).

Flash Point: Not applicable.

Method Used: Not applicable.

Autoignition Temperature: Not applicable.

Flammability Limits in Air
Upper (Volume %): Not applicable.
Lower (Volume %): Not applicable.

6. ACCIDENTAL RELEASE MEASURES

Occupational Release: Collect the material in an appropriate container for disposal. Avoid generating dust. If necessary, use a high-efficiency particulate filter vacuum to clean up residue. Subject to California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65); Keep out of water and sewer supplies.

Disposal: See Section 13, “Disposal Considerations”.

7. HANDLING AND STORAGE

Storage: Store and handle in accordance with all current regulations and standards. Keep separated from incompatible substances.

Safe Handling Precautions: Avoid generating dust when handling. See Section 8, “Exposure Controls and Personal Protection”.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits:

Calcium Oxide
OSHA: 5 mg/m^3 TWA
ACGIH (TLV): 2 mg/m^3 TWA
NIOSH: 2 mg/m^3 recommended TWA (10 h)
WEL UK: 2 mg/m^3 TWA

Silicon Dioxide
NIOSH: 6 mg/m^3 recommended TWA (10 h)
ACGIH (TLV): 3 mg/m^3 TWA (respirable fraction; < 1% crystalline silica)
WEL UK: 2.4 mg/m^3 TWA (respirable dust)

Quartz
OSHA: 0.3 mg/m^3 TWA (total dust)
OSHA: 0.1 mg/m^3 TWA (respirable dust)
ACGIH (TLV): 0.05 mg/m^3 TWA (respirable fraction)
NIOSH: 0.05 mg/m^3 recommended TWA (10 h) (respirable dust)

Aluminum Oxide
OSHA: 5 mg/m^3 TWA (respirable dust fraction)
OSHA: 15 mg/m^3 TWA (total dust)
ACGIH (TLV): 10 mg/m^3 TWA
WEL UK: 4 mg/m^3 TWA (respirable dust)

Ferric Oxide (Fe_2O_3) (Exposure Limits as Fe)
OSHA: 10 mg/m^3 TWA
ACGIH (TLV): 5 mg/m^3 TWA
NIOSH: 5 mg/m^3 recommended TWA (10 h) (total particulate)
WEL UK: 5 mg/m^3 TWA
WEL UK: 10 mg/m^3 STEL

Magnesium Oxide (MgO)
OSHA: 15 mg/m^3 TWA (fume, total particulate)
ACGIH (TLV): 10 mg/m^3 TWA (inhalable fraction)
WEL UK: 10 mg (Mg)/m^3 TWA (total inhalable dust)
WEL UK: 4 mg (Mg)/m^3 TWA (fume, respirable dust)

Manganous Oxide (MnO) (Exposure Limits as Mn)
OSHA: 5 mg/m^3 ceiling (metal, fume, compounds)
ACGIH (TLV): 0.2 mg/m^3 TWA (metal and inorganic compounds)
NIOSH: 1 mg/m^3 recommended TWA (10 h) (metal, fume, compounds)
WEL UK: 0.5 mg/m^3 TWA (metal, inorganic compounds)

Iron (II) Oxide (FeO) (Exposure Limits as Fe)
OSHA: 10 mg/m^3 TWA
ACGIH (TLV): 5 mg/m^3 TWA
NIOSH: 5 mg/m^3 recommended TWA (10 h) (total particulate)
WEL UK: 5 mg/m^3 TWA
WEL UK: 10 mg/m^3 STEL

Lead, Inorganic Fumes and Dust (as Pb)
OSHA: 50 μg/m^3 TWA (8 h)
ACHIG (TLV): 0.05 mg/m^3 TWA
NIOSH: 0.100 mg/m^3 recommended TWA (10 h)

Ventilation: Use a local exhaust ventilation system. Ensure compliance with applicable exposure limits.

Respirator: For conditions of frequent use or heavy exposure where exposure is apparent and engineering controls are not feasible, respirator protection may be needed. Refer to the "NIOSH Guide to the Selection and Use of Particulate Respirators Certified under 42 CFR 84" for selection and use of respirators certified by NIOSH. The SRM is a particulate matter that requires inhalation protection by OSHA because the material's average particulate size, as manufactured, is less than the inhalation average particulate size established by the ACGIH, Appendix D (particulates with average particulate sizes less than 100 micrometers or less than 100 microns require proper inhalation/respiratory protection). Please refer to OSHA Respiratory Protection Standards 29 CFR Part 1910.134 for proper protection.

Eye Protection: Wear safety goggles. An eye wash station should be readily available near areas of use.

Personal Protections: Wear appropriate chemical resistant clothing and gloves to prevent skin exposure.

9. PHYSICAL AND CHEMICAL PROPERTIES

Component: **Lead Ore**

Appearance and Odor: Powder. Odorless.

Density: Not available.

Water Solubility: Insoluble.

10. STABILITY AND REACTIVITY

Stability: _X_ Stable ____ Unstable

Stable at normal temperatures and pressure.

Conditions to Avoid: Avoid generating dust.

Incompatible Materials: Acids. Halogens. Combustible materials. Oxidizing materials. Metals.

Fire/Explosion Information: See Section 5, "Fire Fighting Measures".

Hazardous Decomposition: Thermal decomposition may produce oxides of lead and miscellaneous decomposition products.

Hazardous Polymerization: ____ Will Occur _X_ Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Entry: _X_ Inhalation ____ Skin _X_ Ingestion

Toxicity Data:

Quartz
Human, Inhalation-intermittent LC_{LO}: 300 μg/ m^3 (10 years)
Rat, Intratracheal LD_{LO}: 200 mg/kg
Rat, Inhalation TC_{LO}: 200 mg/kg
Rat, Oral TD_{LO}: 120 g/kg

Lead
Human, Inhalation TC_{LO}: 10 μg/m^3
Human, Inhalation LC_{LO}: 271 mg/m^3
Human, Oral LD_{LO}: 155 mg/kg

Carcinogenic, Tumorigenic, Mutagenic Data:

Quartz is recognized by NTP as a known human carcinogen; Recognized by IARC as a Group 1, Human and Animal Sufficient Carcinogen Evidence; Recognized by ACGIH as an A2, Suspected Human Carcinogen. Quartz has been investigated as a tumorigenic and mutagenic effector.

Lead: No evaluation could be made of the carcinogenicity of powdered lead. Lead has been investigated as a mutagenic effector.

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Medical Conditions Aggravated by Exposure: Respiratory disorders.

Health Effects (Acute and Chronic): See Section 3, "Hazards Identification".

12. ECOLOGICAL INFORMATION

Ecotoxicity:

Galena (PbS)

Fish Toxicity: Fathead minnow (Pimephales promelas) LC_{50} (mortality): 915 µg/L (96 h)

Invertebrate Toxicity: Water flea (Daphnia magna) LC_{50} (morality): 138 µg/L (48 h)

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose in accordance with federal, state, and local regulations.

Lead: Hazardous Waste Number D008. Dispose of in accordance with U.S. EPA 40 CFR 262 for concentrations at or above the Regulatory Level of 5.0 mg/L.

14. TRANSPORTATION INFORMATION

U.S. DOT: Not regulated by DOT.

15. REGULATORY INFORMATION

U.S. Regulations: CERCLA Sections 102a/103 (40 CFR 302.4): Lead Sulfide: 10 lbs RQ.

SARA Title III Section 302 (40 CFR 355.30): Not regulated.

SARA Title III Section 304 (40 CFR 355.40): Not regulated.

SARA Title III, Section 313 (40 CFR 372.65): Lead compounds.

OSHA Process Safety (29 CFR 1910.119): Not regulated.

California Proposition 65: Lead compounds are known to the state of California to cause cancer (1992).

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE:	Yes.
CHRONIC:	Yes.
FIRE:	No.
REACTIVE:	No.
SUDDEN RELEASE:	No.

CANADIAN Regulations: WHMIS Classification: Not determined.

National Inventory Status: U.S. Inventory (TSCA): Quartz, Silicon Dioxide, Calcium Oxide, Aluminum Oxide, Lead Sulfide (galena), Magnesium Oxide, Manganous Oxide, Iron (II) Oxide, Ferric Oxide are listed on inventory.

TSCA 12b Export Notification: Not listed.

EC Classification:	**Galena (PbS) and Quartz**	
	T	Toxic.
	N	Dangerous to the Environment.

EC Risk and Safety Phrases:	**Galena (PbS) and Quartz**	
	R20/22	Harmful by inhalation and if swallowed.
	R33	Danger of cumulative effects.
	R49	May cause cancer by inhalation.
	R50/53	Very toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.
	R61	May cause harm to unborn child.
	R62	Possible risk of impaired fertility.
	S2	Keep out of the reach of children.
	S24	Avoid contact with skin.
	S45	In case of accident or if you feel unwell, seek medical advice immediately.
	S46	If swallowed, seek medical advice immediately and show this container or label.
	S53	Avoid exposure; obtain special instructions before use.

16. OTHER INFORMATION

Sources: MDL Information Systems, Inc., MSDS *Quartz* 16 June 2005.
MDL Information Systems, Inc. MSDS *Garnet* 16 June 2005.
MDL Information Systems, Inc. MSDS *Lead Sulfide* (Galena) 16 June 2005.
MDL Information Systems, Inc. MSDS *Silicon Dio*xide 16 June 2005.
MDL Information Systems, Inc. MSDS *Calcium Oxide* 16 June 2005.
MDL Information Systems, Inc. MSDS *Aluminum Oxide* 16 June 2005.
MDL Information Systems, Inc. MSDS *Manganous Oxide* 16 June 2005.
MDL Information Systems, Inc. MSDS *Magnesium Oxide* 16 June 2005.
MDL Information Systems, Inc. MSDS *Ferric Oxide* 16 June 2005.
MDL Information Systems, Inc. MSDS *Iron (II) Oxide* 16 June 2005.